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REMARKS

This is a full and timely response to the non-final Official Action mailed July 8, 2005. Reconsideration of the application in light of the above amendments and the following remarks is respectfully requested.

Claim Status:

By the forgoing amendment, various claims have been amended. No claims are added or cancelled. Claims 43-56 have been withdrawn under a previous Restriction Requirement. Thus, claims 1-42 are currently pending for further action.

Prior Art:

The outstanding Office Action rejected claims 1-26, 37 and 39-42 as anticipated under 35 U.S.C. § 102(b) by U.S. Patent No. 6,346,986 to Kieronski ("Kieronski"). Claims 1-42 were also rejected as being unpatentable under 35 U.S.C. § 103(a) over the teachings of Kieronski taken alone. For at least the following reasons, these rejections are respectfully traversed.

Claim 1 recites:

A method for producing a three-dimensional object through solid freeform fabrication comprising:

selectively depositing containment material to form a boundary structure, wherein said boundary structure defines a surface of said object; and

depositing a flowable build material within said boundary structure, wherein said flowable build material forms a portion of said object by flowing to said boundary structure.

(emphasis added).

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Independent claim 7 similarly recites:

A method for producing an object through solid freeform fabrication comprising:

selectively depositing containment material to form a boundary structure with a high precision dispenser; and
depositing a flowable object build material into said boundary structure with a low precision dispenser.

(emphasis added).

Independent claim 39 similarly recites:

A method of creating a three-dimensional object with a liquid build material comprising:

selectively depositing containment material to form a structural boundary,
wherein said structural boundary defines a surface of said three-dimensional object;
dispensing a liquid build material into said structural boundary; and
solidifying said liquid build material.

(emphasis added).

In contrast, Kieronski fails to teach or suggest selectively depositing containment material to form a boundary structure or structural boundary. Kieronski teaches using stereolithography to form a part "having opposing interior surfaces. An uncured strength material is interposed between the opposing interior surfaces... . The strength material is chosen to bond to the opposing interior surfaces during the heating step." (Kieronski, abstract). As is well known, stereolithography is a "three-dimensional printing process that makes a solid object from a computer image by using a computer-controlled laser to draw the shape of the object onto the surface of liquid plastic." (<http://dictionary.reference.com>). Stereolithography does not involve "selectively depositing containment material to form a boundary structure," as recited in claims 1, 7 and 39.

"A claim is anticipated [under 35 U.S.C. § 102] only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 2 U.S.P.Q.2d 1051, 1053 (Fed. Cir. 1987) (emphasis added). See M.P.E.P. § 2131. For at least this reason, the rejection of

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claims 1, 7 and 39 and their respective dependent claims under § 102 based on Kieronski should be reconsidered and withdrawn.

With regard to the § 103 rejection based on Kieronski, the recent Office Action concedes that Kieronski does not teach or suggest selective deposition. However, the Action argues that selective deposition modeling "would have been obvious to one of ordinary skill in the art at the time the invention was made in the process of Kieronski principally because selective deposition modeling and stereolithography are two of the common methods used in solid freeform fabrication." (Action of 7/8/05, p. 5).

This position is misplaced because Applicant is not simply claiming selective deposition modeling. Rather, Applicant is claiming a method including "selectively depositing containment material to form a boundary structure, wherein said boundary structure defines a surface of said object." No prior art has been cited that teaches or suggests the selective deposition of containment material to form a boundary structure as claimed.

"To establish prima facie obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974)." M.P.E.P. § 2143.03. Accord. M.P.E.P. § 706.02(j). Consequently, the rejection under § 103(a) based on Kieronski should also be reconsidered and withdrawn.

Independent claim 37 recites:

A method of producing a porous object through solid freeform fabrication, said method comprising:
selectively depositing a first material with a high precision dispenser to form an outer boundary structure;
selectively depositing a smaller, internal boundary structure with said high precision dispenser; and
filling said outer boundary structure with a solidifiable build material, wherein said filling is performed by a low precision dispenser.

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As demonstrated above, Kieronski fails to teach or suggest selectively depositing a first material to form an outer boundary structure. Kieornski further fails to teach or suggest selectively depositing a smaller, internal boundary structure with the same dispenser. For at least these reasons, the rejection of claim 37 and its dependent claims based on Kieornski should be reconsidered and withdrawn.

Claims 1-26 and 39-42 were also rejected as anticipated under 35 U.S.C. § 102(b) by DE 19537264 to Greul et al. ("Greul"). For at least the following reasons, this rejection is also respectfully traversed.

Like Kieronski, Greul does not teach or suggest "selectively depositing containment material to form a boundary structure, wherein said boundary structure defines a surface of said object." As shown in Figs. 2-3, Greul teaches using a form to build two halves of a mold. In Fig. 4, the mold is assembled and, in Figs. 5-7, the mold is filled to produce the desired object. Nowhere does Greul teach or suggest "selectively depositing containment material to form a boundary structure, wherein said boundary structure defines a surface of said object."

Again, "[a] claim is anticipated [under 35 U.S.C. § 102] only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 2 U.S.P.Q.2d 1051, 1053 (Fed. Cir. 1987) (emphasis added). See M.P.E.P. § 2131. For at least this reason, the rejection based on Greul should be reconsidered and withdrawn.

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Claims 1-26 and 39-42 were also rejected as anticipated under 35 U.S.C. § 102(b) by WO 03/027960 to Knoppers et al. ("Knoppers"). For at least the following reasons, this rejection is respectfully traversed.

Knoppers, like the prior art already discussed, fails to teach or suggest "selectively depositing containment material to form a boundary structure, wherein said boundary structure defines a surface of said object" as claimed. Knoppers also does not teach or suggest "depositing a flowable build material within said boundary structure, wherein said flowable build material forms a portion of said object by flowing to said boundary structure" as claimed.

Knoppers teaches that a "three-dimensional object is automatically manufactured by making a surface model of the object; making a voxel model of the object, with a lower resolution than the surface model, the voxel model, place-dependently per voxel, containing information about a composition of the material of which the object must be made at the place of the voxel; *forming the object by pointwise depositing material*, the composition of the deposited material per point being controlled with the voxel model, and the deposition or non-deposition of the material on different sides of the surface being controlled with the surface model with higher resolution than the control of the composition." (Knoppers, abstract) (emphasis added).

It should be noted that Knoppers teaches "forming the object by pointwise depositing material." (*Id.*). Thus, Knoppers clearly fails to teach or suggest "depositing a flowable build material within said boundary structure, wherein said flowable build material forms a portion of said object *by flowing to said boundary structure*." (emphasis added).

Moreover, Knoppers does not teach or suggest depositing a containment material to form a boundary structure. Knoppers only teaches a surface *model* that is used to control the

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composition, resolution or deposition/non-deposition of build material. Nowhere does Knoppers teach or suggest the depositing containment material to form an actual boundary structure as claimed.

Again, "[a] claim is anticipated [under 35 U.S.C. § 102] only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 2 U.S.P.Q.2d 1051, 1053 (Fed. Cir. 1987) (emphasis added). See M.P.E.P. § 2131. For at least this reason, the rejection based on Knoppers should be reconsidered and withdrawn.

Claims 27-38 were rejected as being unpatentable under 35 U.S.C. § 103(a) over the teachings of either Greul or Knoppers taken alone. For at least the following reasons, this rejection is respectfully traversed.

Claim 27 recites:

A method of producing an object through solid freeform fabrication comprising:
selectively depositing containment material to form a plurality of perimeter structures defining an outer surface of said object with a high precision dispenser; and dispensing a volume of fluid build material interior to said perimeter structures.

As demonstrated above, neither Greul nor Knoppers teaches or suggests a method that includes selectively depositing containment material to form one or more perimeter structures that define an outer surface of an object being formed. Additionally, as demonstrated above, Knoppers, in particular, fails to teach or suggest depositing a *fluid* build material interior to a perimeter structure.

Independent claim 37 recites:

A method of producing a porous object through solid freeform fabrication, said method comprising:

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selectively depositing a first material with a high precision dispenser to form an outer boundary structure;
selectively depositing a smaller, internal boundary structure with said high precision dispenser; and
filling said outer boundary structure with a solidifiable build material, wherein said filling is performed by a low precision dispenser.

As demonstrated above, neither Greul or Knoppers teaches or suggests a method including selectively depositing a first material to form an outer boundary structure and selectively depositing an internal boundary structure with the same dispenser.

For at least these reasons, both Greul and Knoppers fail to teach or suggest all the features of either claim 27 or claim 37. As noted above, "[t]o establish prima facie obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974)." M.P.E.P. § 2143.03. Accord. M.P.E.P. § 706.02(j). Consequently, the rejection under § 103(a) of claim 27 and 37, and their respective dependent claims, based alternatively on Greul or Knoppers should also be reconsidered and withdrawn.

Additionally, various dependent claims in the application recite further subject matter that is not taught or suggested by the prior art of record. Specific examples follow.

Claim 8 recites "depositing a sparse array support structure to support said boundary structure." None of the cited prior art references teach or suggest depositing a sparse array support structure to support a deposited boundary structure.

Claim 18 recites "wherein said removing said boundary structure comprises melting said boundary structure." None of the cited prior art references teach or suggest melting a boundary structure.

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Claim 29 recites "dispensing a volume of fluid build material comprises adjusting said volume with a feedback control device." None of the cited prior art references teach or suggest a feedback control device as claimed.

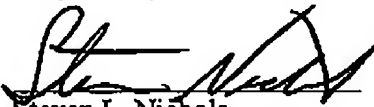
For at least these reasons, the indicated and similar claims should be found patentable over the prior art of record.

Conclusion:

For the foregoing reasons, the present application is thought to be clearly in condition for allowance. Accordingly, favorable reconsideration of the application in light of these remarks is courteously solicited. If the Examiner has any comments or suggestions which could place this application in even better form, the Examiner is requested to telephone the undersigned attorney at the number listed below.

Respectfully submitted,

DATE: 7 October 2005


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